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DIRECTIONS

1. Read the self-study article on pages 38-40 carefully.
2. Answer the questions by clearly marking an "X" in the box next to the best answer for each question.
3. Complete the self-study exam registration form on the back of this page.
4. Clip out this self-study examination page, fold and place in envelope.
5. Enclose a check for \$10.00 made payable to the American Society of Agronomy, for processing fees. Payment in U.S. funds only.
6. **Mail your self-study exam and fee to:**
ASA c/o CCA Self-Study Exam, 677 S. Segoe Road, Madison, WI 53711. *Please allow 60 days for processing.*
7. An electronic version of this test is also available at www.AgProfessional.com. Go to the Certified Crop Advisers section (lefthand column) and access the "CCA Advantage" link.

Particulate and Dissolved Chemical Separation and Phosphorus Release from Treated Dairy Manure December Self-Study Examination

11. Typical mechanical separation efficiencies have ranged from:

- a. 5 to 30 percent of particulate removal.
- b. 10 to 35 percent of particulate removal.
- c. 15 to 40 percent of particulate removal.
- d. 20 to 45 percent of particulate removal.

2. The solid-liquid separation process is a function of:

- a. building larger wastewater lagoons.
- b. siphoning the liquid from the solid.
- c. time, allowing the sediment to settle.
- d. coagulation, flocculation, flotation, sedimentation or filtration.

3. Polyacrylamides and polyamines polymers build bridges between particles, thereby:

- a. preventing aggregation.
- b. making it more difficult to remove particulates.
- c. creating larger aggregates that either float or settle out of the liquid phase.
- d. increasing suspended particulates.

4. Co-blending of polymers and P-immobilizing mineral amendments results in:

- a. increased aggregation and reduced rates of individual additives.
- b. increased rates of polymers or P-immobilizing mineral amendments needed.
- c. increased suspended particulates.
- d. decreased manure particle aggregation.

5. It was found that suspensions can re-stabilize as aggregates disintegrate at a metal salt amendment rate of:

- a. 1 g L⁻¹.
- b. 10 g L⁻¹.
- c. 30 g L⁻¹.
- d. 100 g L⁻¹.

6. High rates of additions of hydrolyzing metal salts exceeding 10 g L⁻¹ can result in:

- a. destabilized manure suspensions.
- b. increased particle aggregation and reduction in rates of manure additives.
- c. increased manure particle aggregation.
- d. lower suspension pH that induces charge reversal and dispersion of manure particles.

7. Fly ash increases liquid-solid separation by:

- a. forming amorphous hydroxides gels that entrapped particulates.
- b. de-stabilizing the manure suspension.
- c. coalescing particles and causing co-sedimentation.
- d. increasing suspended particulates.

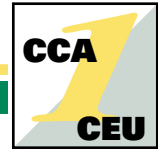
8. Metal salts such as Al₂(SO₄)₃, AlCl₃, or FeCl₃ reduce dissolved P in the liquid phase by:

- a. destabilizing and dispersing manure suspensions.
- b. forming metal amorphous hydroxide gels that sorb and retain manure phosphorus.
- c. lowering solution pH that induces charge neutralization and reversal on manure particulates.
- d. forming aquo-metal ions that surround and complex individual manure particles.

Over

Continuing Education Self-Study Test

Nutrient Management Test (continued)

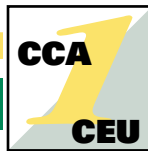


9. Fly ash reduces dissolved P from the liquid phase when

- a. fly ash particles act as in situ screen.
- b. inter-particle distances are reduced.
- c. manure and ash particles coalesce and co-settle.
- d. phosphate reacts with surface hydroxyl and silanol groups of the ash particles.

10. Release of manure P from soil that received treated manure was:

- a. reduced because DRP immobilized in treated manure remained insoluble.
- b. increased because DRP immobilized in treated manure did not remain insoluble.
- c. insignificant because DRP immobilized in treated manure remained insoluble.
- d. undetermined because DRP immobilized in treated manure remained insoluble.



SELF-STUDY EXAM REGISTRATION FORM

Name: _____
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Credit Card #: _____ Type of Card: Visa Mastercard Discovery Am Express
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A \$2 processing fee will be added to all credit card charges, or enclose \$10 check payable to American Society of Agronomy.
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Signature of Registrant as it appears on Code of Ethics _____
I certify that I alone completed this self-study course and recognize that an ethics violation may revoke my CCA status.
This exam issued December 2003 expires December 2006.

SELF-STUDY EXAM EVALUATION FORM

Rating Scale: 1=Poor 5=Excellent

Information presented will be useful in my daily crop advising activities: 1 2 3 4 5
Information was organized and logical: 1 2 3 4 5
Graphics/tables were appropriate and enhanced my learning: 1 2 3 4 5
I was stimulated to think how to use and apply the information presented: 1 2 3 4 5
This article addressed the stated competency area and performance objective(s): 1 2 3 4 5
Briefly explain any "1" ratings: _____
Topics you would like to see addressed in future self-study materials: _____

DETACH HERE